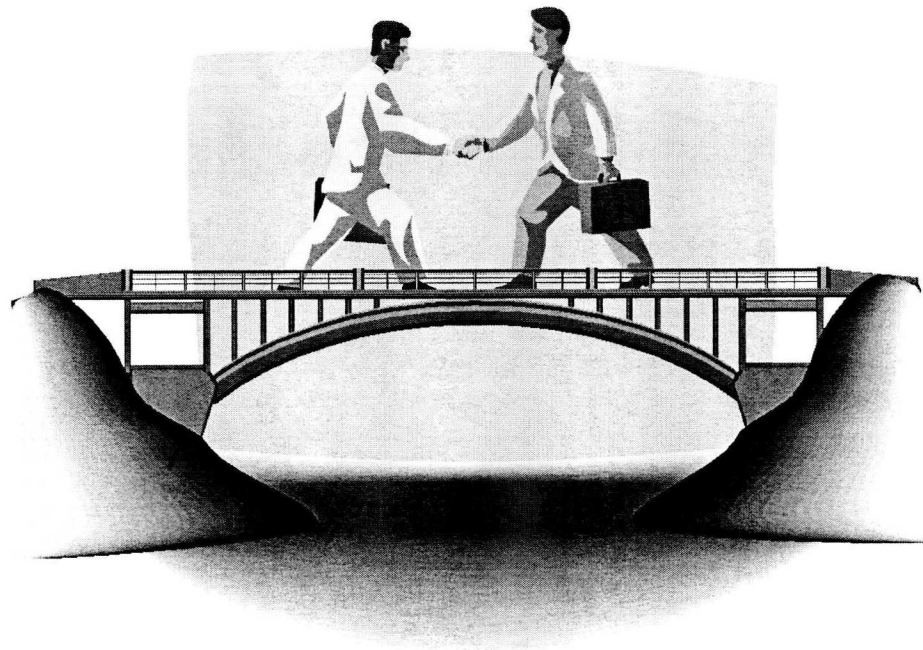
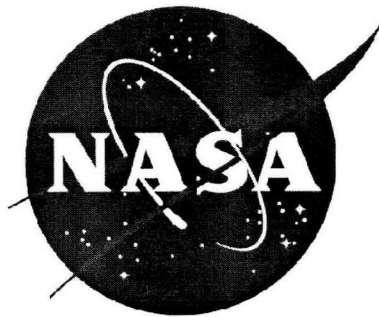


REMEDIATION TECHNOLOGY COLLABORATION DEVELOPMENT



This morning's agenda

1. Why?

2. What?

- is the need

- are the current challenges

- is focus

- has been done to date

- are the forecast challenges

3. How?

WHY?

“...to establish the capability to target reductions in the long-term liability associated with NASA’s most challenging remediation sites.”

*Remediation Technology Collaboration Development
Remediation Task Order - NNH10AA15D*

What...

...are the current challenges?

- **15 Centers each with multiple sites located in 10 States**
- **Various environments:** Desert, urban, suburban, rural, coastal, mountainous, woodland
- **Various geologies/geomorphologies:**
 - Consolidated /unconsolidated materials
 - Sandstones
 - Karst
 - Complex, layered sands/silts/clays
- **Various jurisdictions and regulations**
 - *Federal level oversight:* (USEPA oversight, cleanup conducted under CERCLA or RCRA regulations)
 - *State level oversight:* State cleanup programs (FDEP, NMDEQ, MDE, TCEP)
Agencies within States (CA DTSC vs. CA RWQCB)
 - *County level oversight*
- **Multiple Contaminants** (ranging from petroleum based fuels to solvents to pesticides to heavy metals)
- **Surface waters, soil, groundwater impacted**
- **Sensitive receptors threatened** (municipal drinking water wells, wetlands and other sensitive environmental receptors, human health and safety issues such as indoor air)

What...
...is the focus?

It's all about...

...the technology!!!!!!!!!!

Of course!

- ✓ Phase I: Compile and analyze all available information:
 - Step 1: Gather/research info from available sources
 - Step 2: Interview NASA EMD Liaisons
 - Step 3: Survey NASA Centers
 - Step 4: Analyze current cleanup efforts
 - Step 5: Report of findings

- ✓ Phase II: --Seek to increase efficiency & effectiveness
 - Reduce cleanup time & expenditure
 - Deploy new/different/innovative technologies
 - Identify potential partnerships

Approach

Kennedy Space Center

Multiple sites...40+

Wetlands threatened; Center located adjacent to a wildlife refuge

For instance: (LC-34): 330 acre plume; 2 acre source area; 100k lbs of contaminant;
6,000,000 cu yds of soil contaminated

Jet Propulsion Lab

Several municipal supply wells impacted

2 pump and treat systems in operation: Cost to operate per year = >\$3,000,000

Systems allow groundwater resources to be used again

Santa Susana Field Laboratory

Contamination to ~ 900'

Contaminant in fractures in the bedrock and in the fractures/pore space of the rock itself






White Sands Test Facility

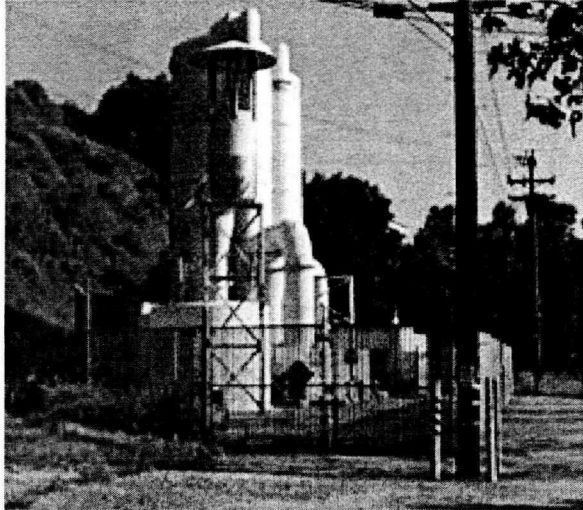
Plume is approx. 4 mi long x 1 mi wide x 300' thick

2 pump and treat systems in operation

What...

...are the ongoing challenges?

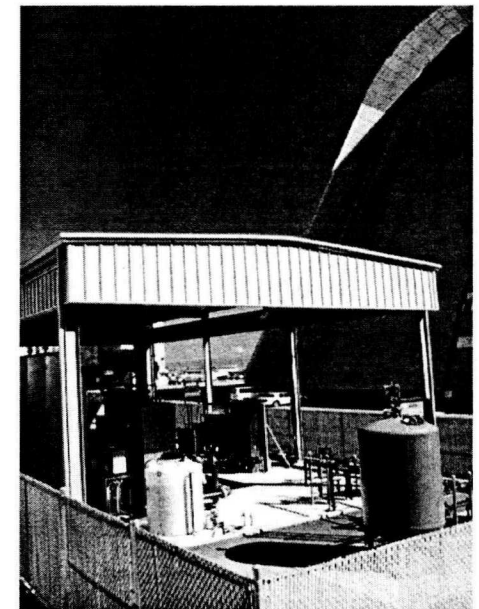
-  costs: labor/materials/utilities/fuel/waste disposal
-  need for resources vs.  amount of resources available
-  regulatory environment & scrutiny
-  public awareness/involvement
- Emerging contaminants



INNOVATIVE SOLUTIONS?

Who knows where we will go in the next 10 years

- ❖ Increased use of nano –technologies
- ❖ Increased call for and use of green and sustainable technologies
 - waste reduction via lo-flo/no purge sampling as a BMP
 - targeted and focused remedial actions following SI's
 - increased use of bioremediation technologies inc. phytoremediation
 - fuel cells or use of biogas where available
- ❖ Renewable energies
 - solar///wind///tidal or wave energy///use of landfill gas
- ❖ Resource preservation practices such as JPL's systems



QUESTIONS?

Contact: Wade Olsen
NASA TEERM
321-867-8467

or visit

NASA TEERM website
<http://www.teerm.nasa.gov>

Thank you...and enjoy the rest of the workshop!